



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

A comparison of the tales with those of the neighboring regions brings out many features of interest. As already stated, there are a considerable number of incidents and even whole tales, which are characteristic of the strongly Hinduized parts of southern Indonesia and the southeastern portions of the Asiatic mainland. The more typically Indian trickster fables are however, largely lacking, although those found in northeastern Indonesia and western Melanesia are well represented. Quite a number of tales belong to what I have elsewhere tentatively called the Indonesian stratum, and are characterized by their occurrence further east in Micronesia, Melanesia and even in Polynesia, and their absence, so far as known, in southeastern Asia and Java. On the whole, the general impression given is that of a primarily Indonesian substratum, upon which a later mass of Hindu-Malay elements has been spread. Had we only as full and reliable material available from a dozen other tribes in the Philippines, then a comparison of the data would go far toward unraveling some of the puzzles of cultural development in this most interesting and important region.

R. B. DIXON

PHYSICAL ANTHROPOLOGY

The Development of the Human Chin. W. D. WALLIS. The Anatomical Record (1917), vol. XII, no. 2, pp. 315-328.

It is since the discovery of fossil remnants of palaeolithic man that the study of the mandible received a new impetus. Not only has the comparative morphological side of the problem been discussed extensively, but also the physiological factors to which adaptive changes are due, *viz.* use, non-use, speech, and such changes as come under the caption of convergence phenomena. The beginning of the specific investigations can be set in the year 1866, when E. Dupont discovered and described the "La Naulette" fragment. "For the first time," says Otto Schoetensack in his excellent work on the Heidelberg mandible discussing the La Naulette point, "was the scientific world disturbed by the observation of 'pithecod' qualities in a human mandible." And early in the eighties of the preceding century, Gabriel de Mortillet commented on the speechlessness of that fossil man, emphasizing the fact of the wanting *Spina mentalis interna*. Several finds of primitive fossils have since brought forth a small deluge of specific literary products, and a number of theories on developmental points. Hermann Klaatsch, whose untimely death we deplore, himself an observer of extraordinary ability and connected with the salvage of many a costly find of later

date, must be mentioned as showing new perspectives in the study of the mandible. By establishing his alveolar horizon he invented a practical, useful, and heretofore wanting method for the comparative study of an essential part of the cranium.¹ We are indebted to him also for a careful revision of the nomenclature concerning the mandible, with the probable exception of his "negative chin." By this is meant the recession of the chin behind a perpendicular erected on the alveolar horizon in the "incision," the measuring point between the two middle incisors on the alveolar ridge of the lower jaw, in analogy to the "prosthion" of the upper jaw. As "negative" would at the same time and certainly on first consideration imply the lack of a chin, which holds only for the Heidelberg specimen and the Anthropomorphae,² the accuracy of the term is somewhat questionable. Phylogenetic changes in the teeth in connection with functional changes have also found an open field for ample theorizing. Careful investigations in the palaeontological field have considerably broadened the aspect, and facilitated and approved argumentation of a decisive character.

In a sort of critical review based on the principal works written on the subject, Wallis deals especially with the chin question. A few historical remarks are followed by sections on speech; decrease in the size of teeth and of the alveolar processes; other osseous changes; muscular and mechanical forces; and changes in head form. We are told that the ancient Greeks when in the act of supplication touched the chin to show their divine affinity and that Pliny recognized the human chin in contradistinction to other animal forms. Linnaeus was the first to observe the chin and that Cuvier attempted the first comparative study of the mandible and offered an explanation for the evolution of the chin by advancing the theory that the retraction of the alveolar process came about in order to fit the originally smaller upper jaw. Thus the chin was produced, a theory substantiated much later by M. Pelletier,³ when she showed the independence of growth between the alveolar part and the corpus of the mandible. The influence of speech, on the other hand, upon the formation (1) of the *Spina mentalis interna*

¹ Klaatsch, Hermann, "Kraniomorphologie und Kraniotrigonometrie," *Archiv für Anthropologie*, N. F. vol. VIII, no. 1/2, pp. 101-123.

² But a very interesting statement is made by Emil Selenka in the second chapter, page 143, of his "Studien über Entwicklung und Schädelbau, *Schädel des Gorilla und Schimpanse*," to this effect: "Auffallend ist die Bildung eines deutlichen Kinnes bei einigen kindlichen Gorillaschädeln mit entwickeltem Milchgebiss."

³ "Contribution à l'étude de la phylogénèse du maxillaire inférieur," *Bulletins et Mémoires de la Société l'Anthropologie de Paris* (1902), ser. 5, v. 3, p. 537-545.

and, (2) upon the chin itself, by the increased application of the *Mm. genioglossi, geniohyoidei* and *digastrici*, is an unsettled question as yet. It is true though, that the spinae are distinctly anthropine formations, when grooves are found in the apes for the insertion of the first two muscles as also in some human fossils where at least the *M. genioglossus* shows such conditions (Le Moustier, Mauer, Krapina G.). It seems to me that the physiological meaning of the spinae should not be attached solely to the function of speech. Rudolph Martin reminds us that the muscles concerned are used in the art of mastication, too, exactly as they are used by lower animals. It may appear to the reasoning mind then, that feeding as a fundamental requirement for the preservation of life and indeed much more strenuously necessitated than speech might be considered as the factor that produced grooves of insertion in the animal and spinae in the man. That the agency of speech cannot simply be eliminated is true and might have helped develop and hand on a new product. The causes underlying this human peculiarity must surely be traced to other phenomena and Wallis is perfectly right when he says (pp. 225-226):

The various portions of the skull are so closely interrelated, either structurally or functionally, that any considerable change in a given region is apt to be reflected by corresponding or compensating changes throughout the entire skull.

And this leads us back to the human chin, its preparatory changes and final establishment. Changes "throughout the entire skull" are preëminently due to changes of the brain, the development and formation of its hemispheres and the consequent expansion of the brain case. It may be recalled here that Bolk has very plausibly demonstrated that the so-called migration of the *Foramen magnum* is also caused by cerebral expansion towards the occipital, showing that its position was rather stable.¹ Compensatory changes in the lower jaw would then be the broadening out of its condyles and subsequent adaptations in the angles, branches, body, and anterior plate. If we add the changes brought about by the decrease and adjustment of the teeth, the retraction of the alveolar processes both in the upper and lower jaws, the necessity of broadening their forward portions, muscular adjustments, we have enough evidence on hand for the explanation of the morphological peculiarity of the chin. Walkhoff's "trajectories" and Mies-Toldt's *Ossicula mentalia* would be found necessary then for meeting the strain

¹ Bolk, Louis, "Über Lagerung, Verschiebung und Neigung des Foramen magnum am Schädel der Primaten," *Zeitschrift für Morphologie und Anthropologie*, 1915, v. xvii, pp. 611-692.

of transformatory exertion in the anterior plate. It does not seem entirely impossible to me that by a gradual cross-tension of the anterior plate in several directions the insertion grooves on its inner surface might have been leveled out by and by; the never ceasing muscular action, increased if one likes by efforts produced in speech, causing the new insertional tuberosities to form spinae of different size as we find them in man.¹ The retraction of the alveolar process going on steadily helping in forming the *Impressio subincisiva anterior* (Klaatsch) the formation of the chin is on its route. Klaatsch says directly, on page 11 of his paper named above, that the *Protuberantia mentalis* must not be considered a newly acquired but as a negative magnitude, conditioned by the persistence of this anterior part of the mandible on the level and in the rounding which this region originally possessed. It is this rounding which Wallis also recognized in the simiae, explaining it as the result of the flattening action of the platysma. In his chapter on "Muscular and Mechanical Forces" a good many pointers are launched that help to shed light on this interesting morphogenetic question. Quite logically the author finally concludes that no one factor should be singled out for having evolved the chin. He has read widely on his subject and given a comprehensive resumé. However a few inadequacies must not be allowed to pass unmentioned. We are agreed on the fragment of "La Naulette," not simply "Naulette" (p. 317). But as we find it correct on the next page, a mere *lapsus pennae* may have occurred. But *lapsus pennae* are surely not accountable for "the Mauer and Krapina G skulls" (p. 317); the frequent use of "simia" as a plural form; "the small hyoid bone" (p. 318) instead of the small horn of the hyoid bone; the "os mentale" (pp. 321 and 324) in place of for instance "regio mentalis"; the misspelling of G. Ruge as "Rugge" (pp. 322 and 323); the statement that "the lower jaw is not anatomically a part of the skull" (p. 325); and the other statement, that "widening of the dental arcade gives more play for the tongue, whether for shifting food or consonants" (328).

BRUNO OETTEKING

¹ Walkhoff has observed very correctly that: "Vergleichend ist leicht zu erkennen, dass bei den tiefstehenden Rassen die Kieferformen noch weit voller sind, während bei den zivilisierten Nationen die Leistenbildungen samt den Knochenvorsprüngen weit mehr zur Geltung kommen." He also speaks of a certain economy in formative material exercised by nature in the higher forms. See Otto Walkhoff, *Der Unterkiefer des Anthropomorphen und des Menschen in seiner funktionellen Entwicklung und Gestalt*, 1902, pp. 226 and 227.